

GERHARD (Wm. Paul) *With the compliments of
the author. al*

THE
MODERN RAIN-BATH

BY

WM. PAUL GERHARD, C. E.

Consulting Engineer for Sanitary Works

presented by the author



*AN acknowledgment of the
receipt of this book would
be esteemed a favor by*

THE AUTHOR.

Office Address : 36 Union Square, New York City.

The Prevention of Fire,

Chiefly with reference to Hospitals, Asylums, and other Public
Institutions,

BY

WM. PAUL GERHARD,

Consulting Engineer for Sanitary Works.

SECOND EDITION, PRICE, POSTPAID, 60 CENTS.

CONTENTS:

Introductory.—Defective and Unsafe Building Construction.
—Sound Building Construction.—Fire-Proof Construction.—Slow-
burning Construction.—Roof Construction.—Defective Chimney
Flues.—Elevators and Staircases.—Means of Egress.—Fire
Escapes.—Heating Apparatus.—Laundry and Drying Apparatus.—
Artificial Lighting.—Protection Against Strokes of Lightning.—
Fire Alarm Apparatus.—Watchman.—Supply of Water for Fire
Extinguishing Purposes.—Fire Extinguishing Apparatus.—Fire-
Rolls and Fire-Brigades.

*"I am rejoiced to see so much good, sound common sense becoming a part of the
instruction of the architect, as is indicated in this paper."*

—HON. EDWARD ATKINSON.

PUBLISHED BY THE AUTHOR,

36 UNION SQUARE,

NEW YORK.

THE
MODERN RAIN-BATH

BY
WM. PAUL GERHARD, C. E.

Consulting Engineer for Sanitary Works



NEW YORK, N. Y.

1894.

[Reprinted from the *American Architect* of Feb. 10, 1894.]

S. J. PARKHILL & CO., PRINTERS, 222 FRANKLIN STREET, BOSTON.

THE MODERN RAIN-BATH.

SINCE the first introduction of the so-called "rain-baths" in Germany I have followed with keen interest and attention the gradual development and rapid spread of this new system of baths, and as it has been my good fortune to have been connected with the planning and construction of the majority of rain-baths installed up to date in this country, it occurred to me that a brief description of the new system would be of interest to the readers of the *American Architect*.

The form of shower or douche used in the rain-bath is not, in itself, new, for it has long been used in connection with the common bath-tub, and it has also been used separately in isolated cases: for instance, as an adjunct to swimming and Turkish baths, or in gymnasiums and athletic-club houses. In the modern "rain-bath" system, however, as recently advocated and applied, *tubs are entirely abolished*, simple douche or shower baths being substituted for the same and being installed as a distinct and independent form of bath. This does not, of course, apply to bath-rooms in private houses, but only to public baths, and to baths for institutions, for manufacturing establishments, for schools, etc.

One feature of construction is novel and of much importance, *i. e.*, the *inclined angle at which the douche is placed in the rain-bath*, the object being to avoid a vertical stream from the douche striking the head of the bather, which to many persons is quite disagreeable. In the new form of rain-bath the bather stands erect under the

douche, which is inclined in such a way that the luke-warm water strikes the body only from the neck downwards, and the head is not wetted except when the bather purposely places the same under the descending shower of water.

The advocates of this novel method of bath-construction claim the following chief advantages for it as against bath-houses fitted up with the usual form of bath-tubs :

1. The first outlay for construction is considerably reduced, because the douches are cheaper than bath-tubs. Likewise are the running expenses for maintenance and repairs reduced, because the apparatus is simple and not liable to get out of order, because douches last longer than copper or enamelled-iron bath-tubs, and because repairs, if needed for such baths, are not considerable in extent.

2. In public bathing-establishments the douche or rain-bath system is much more economical in management than the tub system, for the douche or shower-bath is always ready for use and requires but very little attendance. No time is lost as in the filling of the ordinary bath-tubs, and in the subsequent emptying, cleansing and scrubbing of the sides of the tub after each bath.

3. The douche or rain-bath, while more efficient, consumes less time in application, consequently a larger number of people can take baths in a given time than where bathing is carried on in tubs.

4. The rain-bath requires less space in the planning of a bath-house as compared with the same building when fitted up with bath-tubs. In other words, more bathers can be accommodated in a given space.

5. *The body of a person using a rain-bath does not come at all in contact with soiled-water*, as is the case in bathing in the ordinary bath-tub, for in the rain-bath the water from the douche passes away as waste-water through an outlet in the floor almost as fast as it is delivered. This is one of the leading arguments in favor of the new method, and it is of particular importance in the case of baths for workmen or factory employes, of baths for school-children and of people's baths in tenement-districts.

6. The mechanical and tonic effect of the descending stream in the rain-bath is superior to the tub-bath, both in thoroughly cleansing the body and producing a stimulating effect and good hygienic results, whereas a bath taken in a common bath-tub instead of refreshing the body often has a debilitating effect.

7. The rain-bath requires somewhat less water than a tub-bath,

which consideration is of importance where water is given to consumers by meter-measurement, which is generally the case in public baths and public institutions. The exact proportion between amount used in a tub-bath and amount needed for a rain-bath differs according to the construction, the number and the size of the perforations of the douche, the available water-pressure and the length of time during which the douche is kept running. The saving of water as quoted by Dr. Lassar and others appears to me to be somewhat exaggerated. Experiments by actual meter-measurement, carried out by the writer at the Demilt Dispensary, showed that whereas the tub-bath (a short French-shaped enamelled-iron tub) requires about 45 gallons, the rain-bath with an ordinary douche kept running for three minutes, requires about $22\frac{1}{2}$ gallons ($7\frac{1}{2}$ gallons per minute), or in other words about one-half the amount required for a tub-bath. Three minutes for each bather is the time allowed in the case of military barracks in Germany: a workman or mechanic would in all probability, require the douche to run somewhat longer to effect a thorough cleansing of the body, hands and face after his work.¹

8. Compared with swimming-baths the rain-bath affords a greater degree of privacy, and it can be used both in summer and in winter, whereas the free swimming-baths of many cities are only available during the summer-season.

9. Finally, the danger of communicating disease is somewhat reduced, because no impure, infectious or contagious matter is left in the bath, as might easily happen where the bath-attendant is either hasty or careless in the cleansing of the tub.

What appears to have been the first rain-bath was constructed as early as 1857 by Dr. Duval in a military barrack at Marseilles.

Dr. Alexander Bresgen, surgeon in the Prussian Army, in a pamphlet on baths published in Germany in 1871, was the first to advocate the general introduction of rain-baths instead of tub-baths for all public institutions, enumerating in particular military barracks, prisons, hospitals and factories. Attached to his pamphlet is a plan of an octagonal bath-house with sixteen bathing-apartments with

¹ Since writing the above, I have received some douches from Germany, such as are largely used there in rain-baths, and I find these douches considerably smaller in diameter and with holes less in number and less in diameter than used here. These douches run on an average from $2\frac{1}{2}$ to 3 gallons of water, with a water-pressure of from 25 to 40 pounds per square inch.

overhead inclined douches, and he figures that 120 soldiers can bathe in one hour.

The celebrated French engineer and architect, Tollet, in a pamphlet published in 1877, and entitled "*La Réforme du Casernement et les Bains-douches*," Paris, 1877, submitted plans for three types of rain-baths suitable for military needs.

In the *Revue d'Hygiène* for 1879, Monsieur Vallin describes a primitive form of rain-bath used in an asylum for homeless women and children in Paris.

The first progress toward the general use of rain-baths was made in the case of military barracks and of prisons. At the suggestion of Dr. Munnich, surgeon-in-chief of the regiment, rain-baths were installed in 1879 in the armory of the Emperor Franz Joseph Regiment of the Guards in Berlin, his aim being to bathe quickly a large number of soldiers. Similar baths were fitted-up in the armory of the Infantry Regiment Prince George in Dresden, where twenty-four soldiers can bathe at one time in a large bath-room, also for a cavalry regiment of the Imperial Guards at Potsdam. In 1881, the military barracks of the First Bavarian Infantry Regiment at Munich, were furnished with rain-baths. The well-known military school at St. Cyr, France, was also equipped with these baths.

In Pettenkofer's "*Hand-book of Hygiene*," published in 1882, Prof. Dr. Schuster writing about military barracks, states that experiments with tub-baths for soldiers did not prove successful, first because the tubs are expensive, second because of the large quantity of warm water required, and third, because the time occupied in bathing is too great, and his conclusion is that the douche or rain-bath is much more adapted to the needs of the military service.

Again, for bathing in prisons, jails, workhouses and houses of correction, Dr. A. Baer, of Berlin, recommended in 1882, in the same hand-book, the douche or rain-bath in preference to tub-baths. He describes a prison or jail in the City of Muenster which has eight bathing-compartments fitted up with douches, enabling the bathing of nearly 300 prisoners in four hours.

In the prison of Rouen, Dr. Merry-Delabost installed a large rain-bath capable of bathing 900 to 1,200 prisoners in two days.

The credit of having first advocated the use of the rain-bath for people's or public baths belongs to Dr. Oscar Lassar, who exhibited at the Hygienic Exhibition at Berlin, in 1883, the first people's rain-bath, the construction and equipment of which was carried out by the well-known firm of David Grove & Co.

The Berlin Health Exhibition in 1883, therefore, may be said to have given the first impulse to a more general introduction of this new form of bath, and Dr. Lassar since then became the champion advocate of public rain-baths in Germany. The matter received renewed vigor and impetus by the Berlin Exhibition for the Prevention of Accidents, in 1889, when a special committee arranged for a competition and drew up a programme for the proper construction and installation of workmen's baths on the "rain-bath" principle.

Such people's rain-baths were built and constructed in Vienna in 1887, in Berlin, Frankfort, Magdeburg in 1888, in Munich and Hannover in 1889, in Altona, Breslau, Braunschweig, Mannheim and Mainz in 1890, in Würzburg in 1891, in Cologne, Düren and Muhlheim in 1892, in Leipsic in 1893 and, and are at present constantly and rapidly multiplying throughout Germany, whereas we hear little or nothing of their use in England or other European countries.

To Professor Flugge and Mayor Merkel of the university town of Göttingen belongs the credit of having advocated and introduced the first rain-baths into the public schools of that city. In public schools, where cleanliness of the body is so intimately connected with the problem of school-room ventilation, such rain-baths for the children have proven very successful, and the example of Göttingen was soon followed in other cities, notably Weimar, Sachsenhausen, Magdeburg, Karlsruhe, Mainz, Breslau, Frankfort, and others too numerous to mention.

Rain-baths were likewise soon erected or fitted-up in a great many factories and manufacturing establishments, of which I will only mention the large steel-works of Herr Friedrich Krupp in Essen.

Even on board of steam-ships the rain-bath has been found useful, and I learn that some of the ships of the German Navy, and likewise some of the fast passenger ocean-steamers of the North German Lloyd are fitted-up with rain-baths.

Quite recently, rain-baths have been introduced into the United States, largely at the suggestion of a hydropathic physician, Dr. S. Baruch, of New York City, who had an opportunity to visit and inspect some of the European baths built on this principle.

The first American rain-bath was installed at the New York City Juvenile Asylum. Then followed the people's baths in Centre Market Place, the public baths at the Demilt Dispensary, in the Hebrew Institute, and those erected by the trustees of the Baron de

Hirsch Fund at the corner of Henry and Market Streets in New York City. The plans and the construction of the three last-named baths were devised and superintended by the writer, associated with Messrs. Brunner & Tryon as architects. The writer also acted as consulting engineer for the rain-baths erected in the Young Men's Christian Association Building, at Cedar Rapids, Iowa, designed by Josselyn & Taylor, architects.

In Scranton, Pa., the Pennsylvania Oral High School Building is being provided with rain-baths from plans of Mr. Theophilus P. Chandler, Jr., of Philadelphia. The factory of J. H. Williams & Co., manufacturers of drop-forgings, in South Brooklyn, near Hamilton Ferry, has recently been fitted-up by its owner with rain-baths (although with vertical douches) for the employés.

At this writing a large bath-house is in course of construction, from plans prepared by the writer and under his superintendence, at the State Hospital for Insane at Utica, N. Y.

In this country the "rain-bath" is as yet comparatively little known, but its advantages are so obvious that the writer feels confident in predicting a rapid and successful development of the new form of baths. Since the opening of the Baron de Hirsch Fund Baths the writer has had numerous inquiries about rain-baths from Philadelphia, Chicago, Boston, Cleveland, and also from Southern cities, and he has learned that in Philadelphia the erection of a large people's rain-bath is now being contemplated.

It is sometimes argued that people's rain-baths cannot become popular in the United States because in all large cities and even in the smaller towns, dwelling-houses are rarely built without the convenience of a bath-room. This can hardly be considered a fair statement of the existing conditions. The actual facts in the case would appear to me to be as follows: It is true that the wealthy and the well-to-do classes have in their houses one or several bath-rooms, fitted-up with more or less luxury, and the rich have, moreover, the many bathing-establishments charging a high price of admission, which only people in comfortable circumstances can afford to pay. On the other hand, it must not be overlooked that even in the houses of the well-to-do people proper provision is rarely made for servants' baths. Again, the middle classes who in New York City, for instance, are largely compelled to live in flats or apartment-houses (the higher-sounding name for improved tenement-houses), have, with rare exceptions, only a narrow, dark and gener-

ally uninviting bath-room, and the mistake is, moreover, usually made by architects or builders of locating the water-closet almost invariably in the same room. But the poorer classes of our population, including mechanics, salesmen, clerks, etc., have rarely any bathing facilities whatever, and there are thousands of tenement-houses, especially in the densely-populated districts of our large cities, which do not afford the convenience of a bath.

People's baths, therefore, would seem to me to be just as much needed here for health and cleanliness of the people as they are in Europe.

Rain-baths, however, are not merely suitable for public or people's bath-houses in populous districts. As their success in Europe has fully demonstrated, they are eminently adapted for many other classes of buildings, among which I will mention the following :

1. Institutions, such as general hospitals, hospitals for the insane, hospitals for infectious diseases, orphan asylums, prisons, institutions for feeble-minded children, for the blind, etc.
2. Gymnasiums, college buildings and club-houses.
3. Public schools.
4. Factories and manufacturing establishments, breweries, central slaughter-houses or abattoirs, etc.
5. Military barracks and armories.
6. Hotels.
7. Railroad stations, for railroad employés, in particular for the engineers and firemen, and the clerks of the railway mail-service.
8. Quarantine establishments.
9. On board of merchant steamships, ocean steamers and men-of-war.

The general arrangement of rain-baths as well as the details of construction vary, each case being a problem in itself. For whatever purpose they may be constructed, the baths should be tidy and neat, kept scrupulously clean and inviting in appearance, and well ventilated, heated and lighted. It will suffice to mention briefly a few of the more important features.

The main bath-room is sometimes divided into a dressing-room, and a separate room containing the douches, or else the dressing-rooms are arranged in a row on one side of the room, whereas the apartments containing the douches are placed on the opposite side.

Such arrangement is preferred for schools, hospitals and military barracks. In the case of people's baths it is preferred to combine the dressing-room and the bath proper, separating the two only by means of a waterproof curtain. Each bath is generally four feet wide and four feet deep, whereas the dressing-room is four feet wide, and from three to five feet deep. The floor of the bath may consist of concrete covered with a final coat of pure Portland cement, or else some artificial stone floor, such as is used for sidewalks, is laid. The floor may also consist of marble mosaic or vitrified tiling, or else of asphalt, which is more impervious to water than cement, and is more agreeable to the feet than a cement floor. The cement floor is often covered in the dressing-room with a removable sectional wooden lattice, or gridiron-floor to keep the feet dry, but such wood soon rots and requires frequent renewal. In all cases the floor of the dressing-room should be graded toward the bath-apartment.

In many rain-baths the floor of the bathing-apartment is sunk or depressed, being moulded in concrete in the form of a basin from four to six inches deep with rounded corners. In order to make the basin hold a few inches of water and thus answer for a foot-bath, the number of holes in the strainer over the waste is properly adjusted so that the water does not flow away as fast as delivered by the douche, or else a standing overflow with trumpet-shaped mouth is arranged.

It is not easy to decide what material is best adapted for the upright partitions or divisions between the bathing-apartments. A non-absorbent material, such as opaque and non-transparent glass, marble or slate would, of course, be best from a sanitary point-of-view, where economy is no object. The partitions may be covered with glazed tiles, and the walls may be tiled or faced with glazed or enamelled brick. Often the divisions are made of corrugated iron, galvanized and afterward painted with special bath-enamel paint. The cheapest partitions are those of wood, if well filled and oil-painted, and such I find are used in many of the people's baths in Germany, although they are undoubtedly inferior in point of cleanliness and durability to marble or slate. Sometimes marble divisions are used for the bath compartment and wooden divisions, painted with English white enamel paint, for the dressing-rooms.

The partitions should not be less than seven feet in height, and it is advisable to keep the bottom of all partitions from ten to sixteen inches from the floor to facilitate cleaning operations, and to promote the circulation of air.

The douches are made either of copper or of spun brass, and may be finished either by tinning or by nickel-plating. Copper douches are somewhat cheaper than brass, but they should be made very strong and should have well soldered joints where the pressure of water is heavy, otherwise it may happen that the facing will blow out. It is preferable to have the face of the douche fastened with screws or bolts, so as to have the same removable in case the holes become stopped up by impurities in the water. The number and size of the holes should be calculated and adjusted to the available water-pressure so that the douches will deliver from 5 to $7\frac{1}{2}$ gallons of water per minute. In order to be able to vary the angle of the descending stream it is best to fasten the douches to the supply-pipes by means of swivel joints. In order to enable each bather to control the douche, a strong self-closing cock with combination lever, chain and pull is inserted in the branch supplying each douche, and a hook is provided to fasten the chain to, in order to leave both hands of the bather free. Such cocks or shut-offs, may, however, be dispensed with whenever a bath-attendant controls the bathing-apparatus, as in schools, military barracks and institutions.

The water-service pipes, which are generally carried exposed along the ceiling of the apartments, may be more or less complex in arrangement. Sometimes both hot and cold water-pipes are provided and carried to each bath compartment, in which case each of the latter requires a separate mixing-valve, generally fitted with a hot-water thermometer. As a rule, however, the warm water of a temperature suitable for bathing and varying from 85° to 110° Fahrenheit, is mixed at a central apparatus, and carried and distributed to the douches by a single warm-water main. The best mean temperature of the warm water at the douche is about 100° Fahrenheit. Provision must be made by a large supply-pipe for an abundant supply of water.

Likewise should the waste-pipes from the bath be ample in size to carry off quickly all soiled water. The main drain should be laid with the greatest care, and wherever possible it is advisable to use a separate sewer for the bath-house where the same is located in a building having other plumbing work.

All plumbing should be durable and substantial, of the best of its kind and perfect from a sanitary point-of-view. A good flushing-rim water-closet with flushing-cistern, a well-flushed urinal, and a cleanly earthen or enamelled-iron slop-sink should always be pro-

vided. A hose sill-cock with rubber-lined hose, for flushing the floors and cleaning the bath-house generally, must not be forgotten.

Where a general waiting-room is provided, its floor should be tiled, and provided with a safely trapped floor-drain, with shut-off gate-valve.

The bath-house should be properly and comfortably heated and suitably ventilated. All bath-compartments should be lighted by gas, or better still by incandescent electric-lights.

The bathing-compartments should be fitted with plain and substantial furniture, as follows: In the bath proper there should be a perforated brass or galvanized-iron soap-cup and sometimes a wooden foot-stool or a galvanized-iron seat, while the dressing-room should have a well fastened hardwood seat, generally quarter-circle in shape, a number of enamelled-iron clothes-hooks, a towel-rack, a cuspadore and an iron boot-jack.

It is doubtful whether it is proper to provide comb and hair-brush in each dressing-room, because by the promiscuous use of these toilet articles diseases of the hair or scalp may be communicated from one person to another.

Mirrors in bathing-compartments generally become covered with watery vapor and are thus rendered practically useless, and it is quite sufficient to provide one large mirror in the main vestibule or hall of the bath-house.

The entrance from the waiting-room to the dressing-room should have a light wooden lattice door, cut off at bottom and at the top so as to admit of plenty of air for circulation. A door between the dressing-room and the bath-room proper is not needed; it generally suffices to put up a rubber curtain or a curtain of coarse cheese-cloth to prevent the splashing of the douche and the wetting of the clothes of the bather. It should be mentioned that physicians are opposed to the use of any curtain as being liable to take up and retain disease germs.

A question of prime importance in the construction and fitting-up of "rain-baths" is the provision of a large quantity of warm water, and, at least in the case of public baths, their ultimate success may be said to hinge largely about this point.

In private houses an abundant supply of hot water for bathing is, as a rule, provided for by the water-back in the kitchen range in connection with the kitchen boiler or reservoir for hot water. But for all large bathing-establishments special means for warming

water are required, such as hot-water heaters with coal or gas fire, or else closed boiler-iron tanks heated by steam coils. Sometimes the water is heated by the direct admixture of steam, but this is a method not much to be commended.

Whatever the system may be, the warm-water apparatus to be successful should be simple, efficient and reliable; there should be no unnecessary loss of heat, and the water for baths should never become over-heated and thereby expose the bather to the danger of scalding.

In nearly all cases where a larger number of rain-baths are fitted-up, whether in bathing-houses, factories, institutions, schools, hotels, breweries or other buildings, a steam-boiler plant is erected in the building for heating or power purposes, and steam is therefore available for the generation of warm water in the form of either high or low pressure steam, or else of exhaust steam. The ordinary hot-water tank, however, heated by a steam coil, is open to many objections, being unreliable and difficult to regulate, therefore wasteful in heat. The Tobey hot-water heater is constructed with a view of obviating this difficulty and is, to some extent, successful. The ordinary hot-water tank has been fitted-up with an automatic attachment regulating the supply of steam. Both devices are, however, expensive and somewhat complicated.

Quite recently a novel and ingenious form of apparatus for heating water by steam has been devised which promises to work very successfully. About this I hope to say something in the near future.

Wm Paul Gerhard

